SOLUTION

a. The left graph in Figure 1-4g shows that $g(2) = -1$ and $g(6) = 3$ but $g(8)$ does not exist, because 8 is outside the domain of function g. The right graph shows the two output values of function g, -1 and 3, used as inputs for function f. From the graph, $f(3) = 2$ and $f(-1)$ does not exist, because -1 is outside the domain of function f. Summarize the results:

$f(g(6)) = f(3) = 2$

$f(g(8))$ does not exist because 8 is outside the domain of g.

$f(g(2)) = f(-1)$, which does not exist because -1 is outside the domain of f.

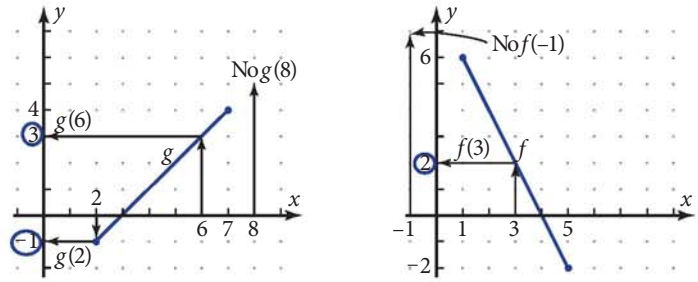

Figure 1-4g

b.

x	$g(x)$	$f(g(x))$
1	none	none
2	-1	none
3	0	none
4	1	6
5	2	4
6	3	2
7	4	0
8	none	none

The domain of $f \circ g$ seems to be $4 \le x \le 7$.

c. Enter: $f_1(x) = x - 3/(x \ge 2 \text{ and } x \le 7)$ for $g(x)$

Use Boolean variables or enter the domain directly, depending on your grapher, to restrict the domain.

Enter: $f_2(x) = -2x + 8/(x \ge 1 \text{ and } x \le 5)$ for $f(x)$

Enter: $f_3(x) = f_2(f_1(x))$ for $f(g(x))$

f_1 and f_2 become function names in this format.

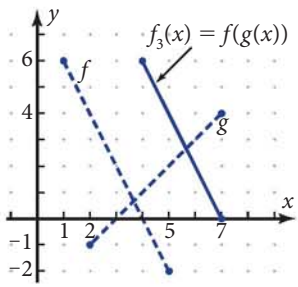

Figure 1-4h

Graph (Figure 1-4h), showing $f(g(x))$ solid style.
The domain of $f \circ g$ is $4 \le x \le 7$, in agreement with part b.
From the graph, the range of $f \circ g$ is $0 \le y \le 6$.